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sterile (probably only seedlings), appearing later, are the exception. Nor is this species so choice as to habitat, for it is very abundant over all north-facing slopes, whether open and grassy or wooded. In fact, it is found in places where *E. albidum* could not be made to grow.

To recapitulate: The points most especially to be noted as marking the species are, early appearance, more slender aspect throughout, leaves unmottled, perianth only half reflexed at most, flowering forms vastly more numerous than sterile and appearing first, corm rather bulb-like and without runners, and range of habitat more extended. Indeed, the points of difference between this form and *E. albidum* are more numerous and more marked than between *E. albidum* Nutt. and *E. Americanum* Smith.

EXAMINATION OF SOLANUM ROSTRATUM.

BY W. S. AMOS AND L. E. SAYRE, PH. G., LAWRENCE.

The common bull nettle of the fields and roadsides, *Solanum rostratum*, is one of the common weeds belonging to the natural order *Solanaceae*, familiar to every one—so familiar that any minute description is quite unnecessary. It is very prickly in all parts of the plant; hoary, with a copious woolly, stellate pubescence. It has been our purpose to ascertain whether the plant contained any large per cent. of alkaloid similar to that of other species obtained from this order, such as hyoscyamus, stramonium, belladonna, tobacco, etc.

For the purpose of this investigation, the leaves and leafy tops were selected, and subjected to the following treatment: The air-dried powder was subjected to the temperature of 110 degrees centigrade, in a drying oven, until it ceased to lose weight. The powder, by this treatment, lost 15.5 per cent., which was estimated as moisture. Two grams of the powder were incinerated in a platinum capsule, and the ashes treated with hydrochloric acid and water; the solution, upon examination, gave reaction indicating the presence of calcium, magnesium, iron, sodium, aluminum, silica, phosphoric acid. The powder treated with ether by continuous percolation yielded an extract 3.26 per cent. This extract was of a deep green color, with a resinous, oleaginous and bland taste; odor, strong and hay-like. It consisted mainly of coloring matter and inert resin. The residual powder left after treatment with ether in a continuous percolator was treated with alcohol; the alcoholic tincture was evaporated to dryness, leaving a dark green extract having a heavy narcotic odor, very sharp and oleaginous taste. The yield of alcoholic extract was 5.14 per cent. This alcoholic extract was treated with water acidulated with sulphuric acid, and filtrated, the filtrate rendered alkaline by ammonia and shaken with ether in a separator. The ethereal layer was separated and evaporated, yielding an extract .98 per cent. The color of this ethereal extract was greenish, the odor quite narcotic. Under the lens, small, feathery crystals could be seen. A small portion of the extract was incinerated on a platinum foil, which left a very minute residue. The extract was again treated with acidulated water, to dissolve out any of the alkaloid, and bring it into a pure state. The solution thus made was treated with various alkaloidal reagents—potassio-mercuric iodide, phospho-molybdic acid, tannic acid, platinic chloride—which gave unmistakable signs of the presence of the alkaloid. On evaporating the acidulated solution over sulphuric acid on a watch crystal, and examining under a one-inch objective, numerous minute crystals, acicular and in bundles, were seen.

The residual powder, after treatment with alcohol, was treated with other solvents, according to the method of Dragendorff, with the view of ascertaining whether any alkaloid was left behind in the drug after treating with alcohol. The result was negative.

Inferring from these experiments that alkaloid was present in the drug, that it could be extracted by an alcoholic solvent, an alcoholic fluid extract was then made, each cubic centimeter of the preparation representing one gram of the drug. This was made in quite a large quantity for the purpose of assay.

Assay.—10 c. c. of the fluid extract was put into a separator, and a few drops of solution of ammonia added; to this 10 c. c. of chloroform were added, agitated with 10 c. c. of water, and again agitated. The chloroformic layer, which was easily separated, was drawn off into a second separator, containing 5 c. c. of water to which had been added a few drops of dilute sulphuric acid, agitated, and when the chloroformic layer had separated, it was drawn off into a third separator, containing 5 c. c. of acidulated water, again agitated, and allowed to stand, which allowed the chloroformic layer to separate, which was then drawn off. To the contents of the first, meanwhile, were added 10 c. c. of fresh chloroform, which was passed into the several percolators as before. The acidulated aqueous fluids were mixed and rendered alkaline with ammonia, thus separating the alkaloid in a tolerably pure state. The neutralized fluid was washed with three successive portions of chloroform: 10, 10, and 10 c. c., respectively. The chloroformic solution evaporated. The somewhat crystalline residue was dissolved in acidulated water, and the solution divided into two portions, each portion representing 5 c. c. of the fluid extract. This was triturated with solution of potassio-mercuric iodide (Mayer's reagent), NI_{20} , which required .7 c. c. of this reagent. According to Dragendorff, 1 c. c. of Mayer's reagent, NI_{20} , precipitates .00625 of atropine. Estimating the amount of this unknown alkaloid from the above data, we have .00625 multiplied by .7 = .004375, which, multiplied by 20 to obtain the percentage, gives us .087 per cent. The 5 c. c., corresponding to the one just examined, was tested gravimetrically, by adding Mayer's reagent in excess and weighing the precipitate. The precipitate, when dried, weighed .015, which, when multiplied by .449, (see Lyon's Pharmaceutical Assaying, page 56,) yielded .094 per cent.

For the purpose of confirmation, still another process of assay was tried, a process recently introduced by Prof. J. U. Lloyd, of Cincinnati: 5 c. c. of the fluid extract were placed in a porcelain mortar, with 1 c. c. of solution of perchloride of iron and bicarbonate of soda added, until a stiff magma was produced; then this magma was extracted by repeated trituration of chloroform. This excludes tannates, gums, albuminates, mineral salts, most vegetable acids and salts, and most coloring matters. Chloroform extracts the chloroform; the alkaloids mixed with the wax, some resins, chlorophyll, and fats. The alkaloid chloroform was extracted by rotating in a bulb separator with repeated portions of dilute sulphuric acid (one part in 50 of water). The aqueous acid solution was extracted in a separator by stronger ether in repeated portions, the ether separating the chlorophyll. The acid solution was neutralized with ammonia and rotated in a bulb separator with chloroform, thus abstracting the alkaloid in a tolerably pure state. The chloroformic solution was evaporated in a tared dish and the residue weighed. This residue weighed .058, which, multiplied by 20 = 1.160, the percentage of alkaloid, estimated by this so-called easy process.

In presenting the foregoing, the authors are conscious of the fact that any chemical assay is open to numerous objections unless it places before us, in a definite, crystallized form, the active principle that we seek to estimate, and this supple-

mented by certain physiological tests. These latter points are now out of the question, for the limited time we have had to work. We have, however, a very few crystals of the substance here to present, promising to follow the investigation further as time permits.

AN INEXPENSIVE REAGENT BOTTLE, OF SERVICE IN MICROSCOPIC WORK.

BY PROF. E. B. KNERR, MIDLAND COLLEGE, ATCHISON.

A very convenient reagent bottle, of service in preparing mounts for the microscope, may be made in a few minutes from an ordinary wide-mouth, half-ounce or ounce bottle, a short piece of glass tubing, a bit of rubber tubing, and an ordinary wood cork to fit the bottle.

Having selected a piece of glass tubing about one-fourth inch in diameter and two feet long, soften it in a flame and draw out to a narrow contraction at intervals of about four inches, then cut off the sections with a file. After about six of these have been made, again cut each one through the middle with a file, and round off the sharp edges of both ends by holding in the flame a few seconds, taking care, however, not to allow the smaller end to close up. In this way enough tubes for a dozen bottles can be made in a few minutes. Next select corks to fit the bottles, and with a cork borer make a hole through the middle of each of proper size to admit one of the glass tubes and hold it firmly. Pass the tubes (each being somewhat over two inches long) through the corks until, when placed in the bottles, the narrow end will almost reach the bottom. This will leave about three-eighths of an inch of the wide end of the tube extending above the cork. Over this protruding portion pass about $1\frac{1}{2}$ inches of rubber tubing one-fourth inch in diameter. Now close the open end of the tube by about one-fourth inch of the core that was removed from the cork in making the perforation, and the bottle is complete. I find it very convenient to have a dozen or more, one for each fluid employed in working about the microscope. These bottles are very inexpensive, the whole dozen costing not more than a single one of the glass-stoppered, glass-covered dropping bottles, and they work more satisfactorily.

In use, the rubber tube above the cork is first compressed, then the pressure relaxed, thus filling the glass tube with liquid. Cork and tube are now removed together from the bottle, and as much of the liquid as is desired is delivered just where wanted on the glass slip by again compressing the rubber. The cork and tube are now returned to the proper bottle, where they will be in readiness when again wanted, meanwhile serving as a stopper to exclude dust or moisture as effectually as any glass cover ever devised.

This simple device was first described by the author in *The Microscope* for April, 1891, but he again presents it, hoping that it may prove as convenient to others as it has to himself.

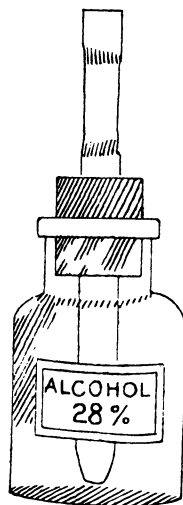


FIG. 1.